The Potential and Power of Market-Based Renewable Energy Policies to Enhance Air Quality and Economic Development in Arizona

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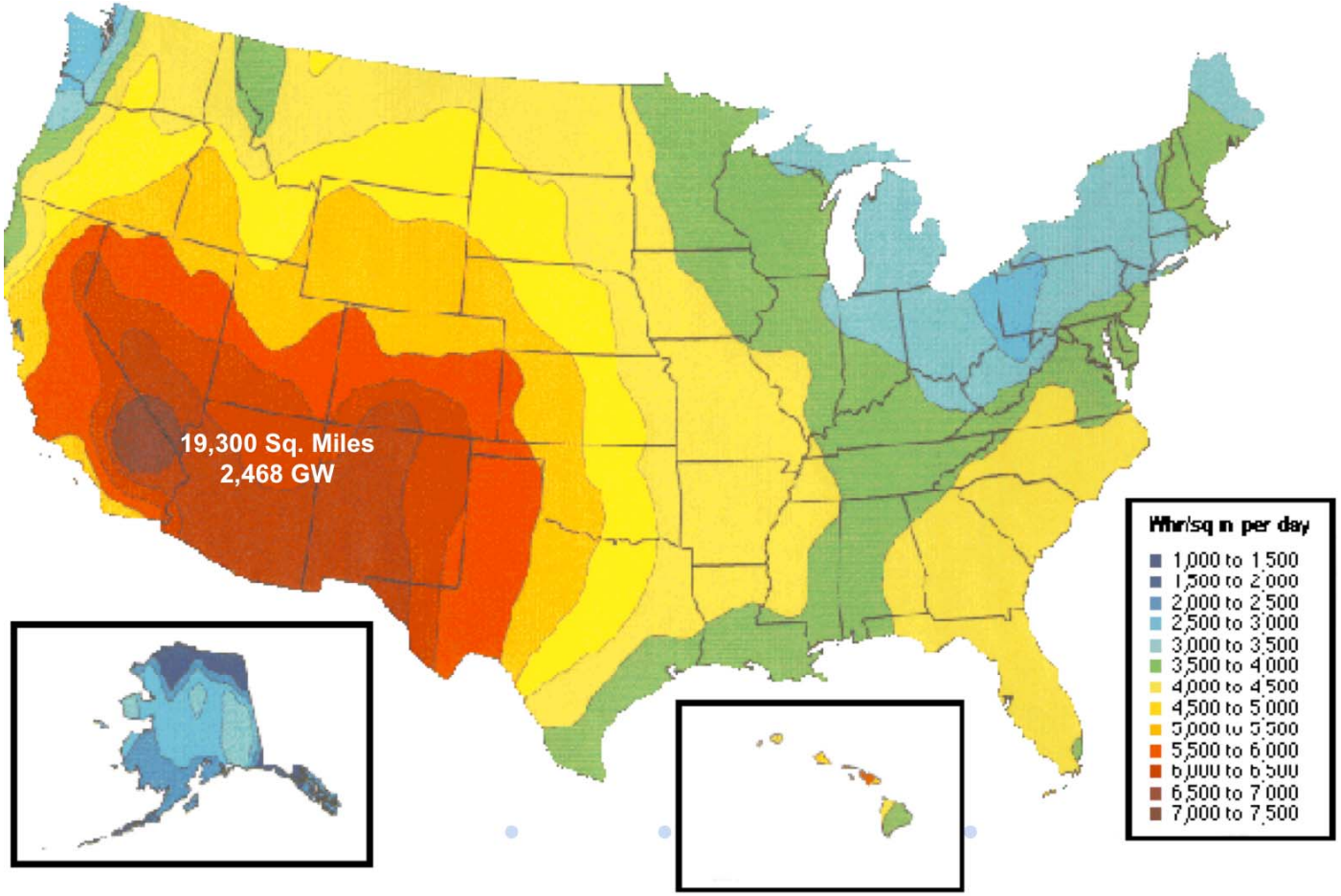
Arizona: Renewable Resource-Rich

- "Heliocentric" economy
  - Has always revolved around the Sun – pleasant climate, agriculture
  - AZ should look once again to the Sun to power growth and development through renewable energy

- Goal: improve environmental quality + economy
  - Increase the displacement of emissions from fossil fuels and become a net exporter of renewable power

Solar Insolation Data for the U.S. (NREL)



What should Arizona's renewable energy goal be? Why not ...

- ... make renewables our dominant source of peaking power in the southwest?
  - *We are not meeting market potential today*
  - *71% of Arizona voters want to invest more in renewable energy**
- Achieving goal will result in:
  - Economic Growth
  - Energy Security
  - Displaced Emissions / Cleaner Air
    - Associated health benefits

***Source: Public Opinion Strategies and Fairbank, Maslin, Maullin, Metz and Associates Opinion Poll**

Outline

I. Building Blocks for a Vibrant State-Level Renewable Energy Market

   A. Sufficient policy support
   B. Flexible form of renewable "currency"
   C. Adequate transparency

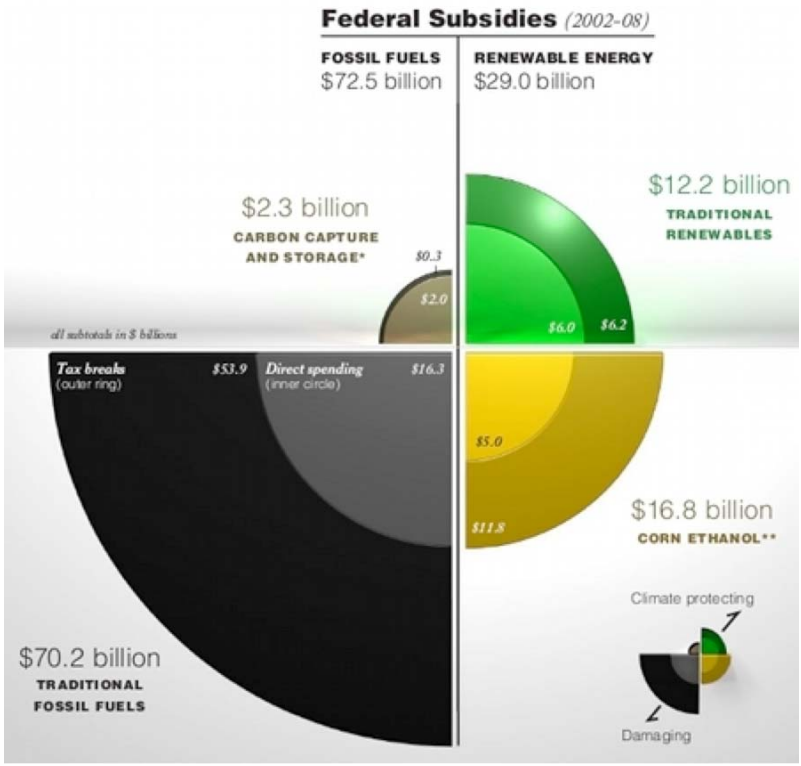
II. Arizona: Renewable Energy Goals

   A. Current status of renewable energy market in AZ
   B. Exploration of options for increasing deployment of renewables in AZ

Importance of Policy Support

- History of coal, oil, natural gas and nuclear power shows that no energy sector was developed without sufficient subsidy
- Different ways to structure an effective RE policy
- Adequate fiscal support to stimulate demand
  - Benefit: hedge against rising fuel prices

Importance of Policy Support



Source: Environmental Law Institute

Preferred policy tool: Renewable Energy Standard (RES)

- Most popular state-level subsidy for renewables
  - Adopted by 29 states, D.C. and Puerto Rico
- Market-based policy
  - Utilities must procure a certain percentage of renewable energy (RE) within their generation mix
  - Doesn't pick a "winner"

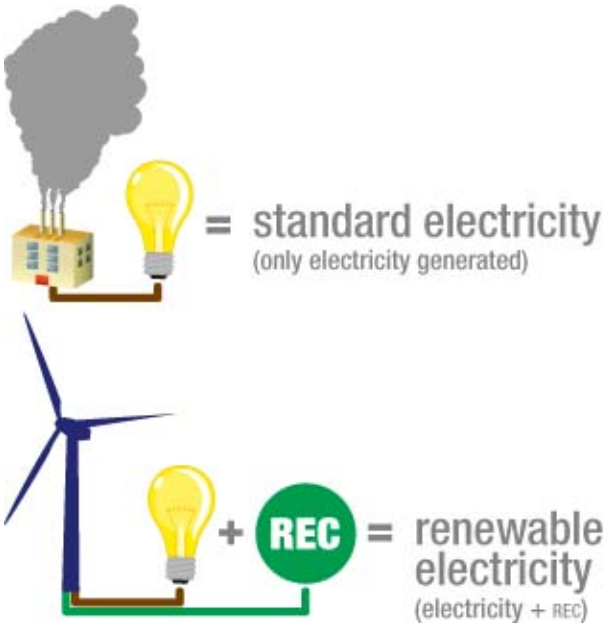
Renewable Energy Standards

- Nationally, RESs (or "RPSs") immensely effective
  - 2009: RPS policies collectively called for utilities to procure **29.5 million MWh** of RE
  - 2014: RPS policies collectively call for utilities to procure **100 million MWh** of RE
    - **239% increase from 2009 to 2014**

A flexible "currency" in renewables market: Renewable Energy Credits (RECs)

- Two Components of renewable energy:
  - Commodity electricity or electrons: null power
  - Environmental, non-power attributes of generation: tradable Renewable energy credits, or "RECs"

What exactly *is* a REC?
Ans: (1) tradable manifestation of envtl attributes of RE; (2) financing mechanism for RE, b/c conveys public subsidy $



Source: Green-e® Energy

The benefits of RECs:

Enhances efficiency of renewables market

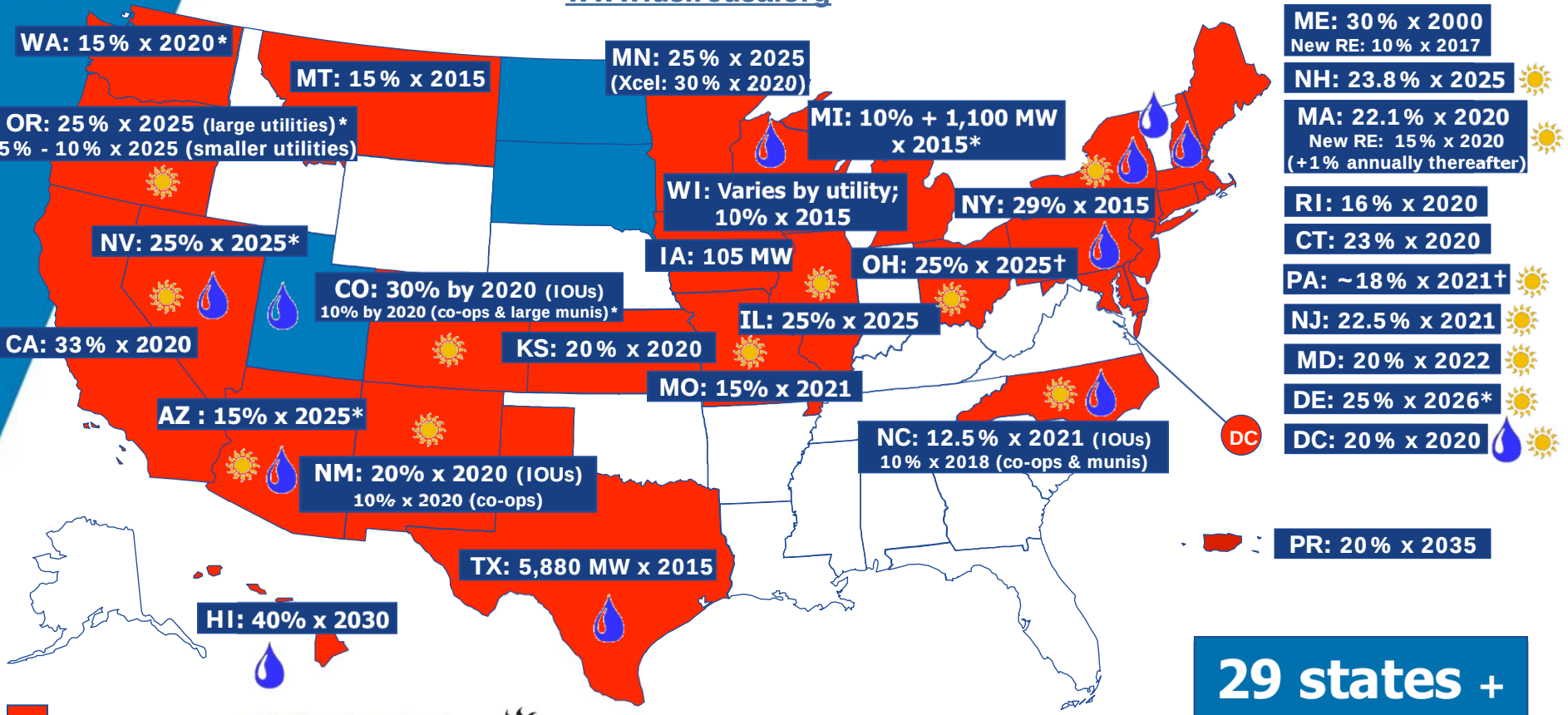
- Potential to expand the confines of state RE market
  - RECs can be traded regionally or nationally
  - Allows state to act as net importer/exporter of RE
  - Avoids regulatory issues of transporting physical electrons

Renewable energy market integrity mechanisms

- Tracking Mechanism
  - Prevents Double Counting
  - Facilitates Interstate Transfer of RECs
- Sufficient Noncompliance Penalties
  - Stabilizes REC Price, increases certainty
- REC price transparency
  - Lack of transparency can obscure opportunities

RPS Policies

www.dsireusa.org



Renewable portfolio standard

Renewable portfolio goal

Solar water heating eligible

Minimum solar or customer-sited requirement

* Extra credit for solar or customer-sited renewables

† Includes non-renewable alternative resources

29 states + DC and PR have an RPS
(7 states have goals)

How is AZ not living up to its renewables' potential?

AZ REST is not meeting current demand for renewable power in AZ:

AZ REST based on Nov. 2006 Az Corp. Comm. Rules:

- Graduated compliance schedule – 15% in 2025 and thereafter.
  - 2010: 2.5% (20% distributed generation)
  - 2011: 3.0% (25% distributed generation)
- Of this, 30 % (4.5% total retail sales in 2025) must be from distributed generation (½ from residential; ½ from commercial)

How is AZ not living up to its renewables' potential?

AZ REST is not meeting current demand for renewable power in AZ:

- Utility Scale
- Distributed Generation set-aside (30 percent):
  - Commercial
    - APS compliant through 2012
  - Residential

Policy Options to Explore

- Increase the REST quantitative RE goals
- Incorporate flexibility by allowing tradable RECs and a small percentage of REST goal to be satisfied by "unbundled" RECs (RECs from anywhere)
- Employ online tracking system
- Impose transparent non-compliance penalties

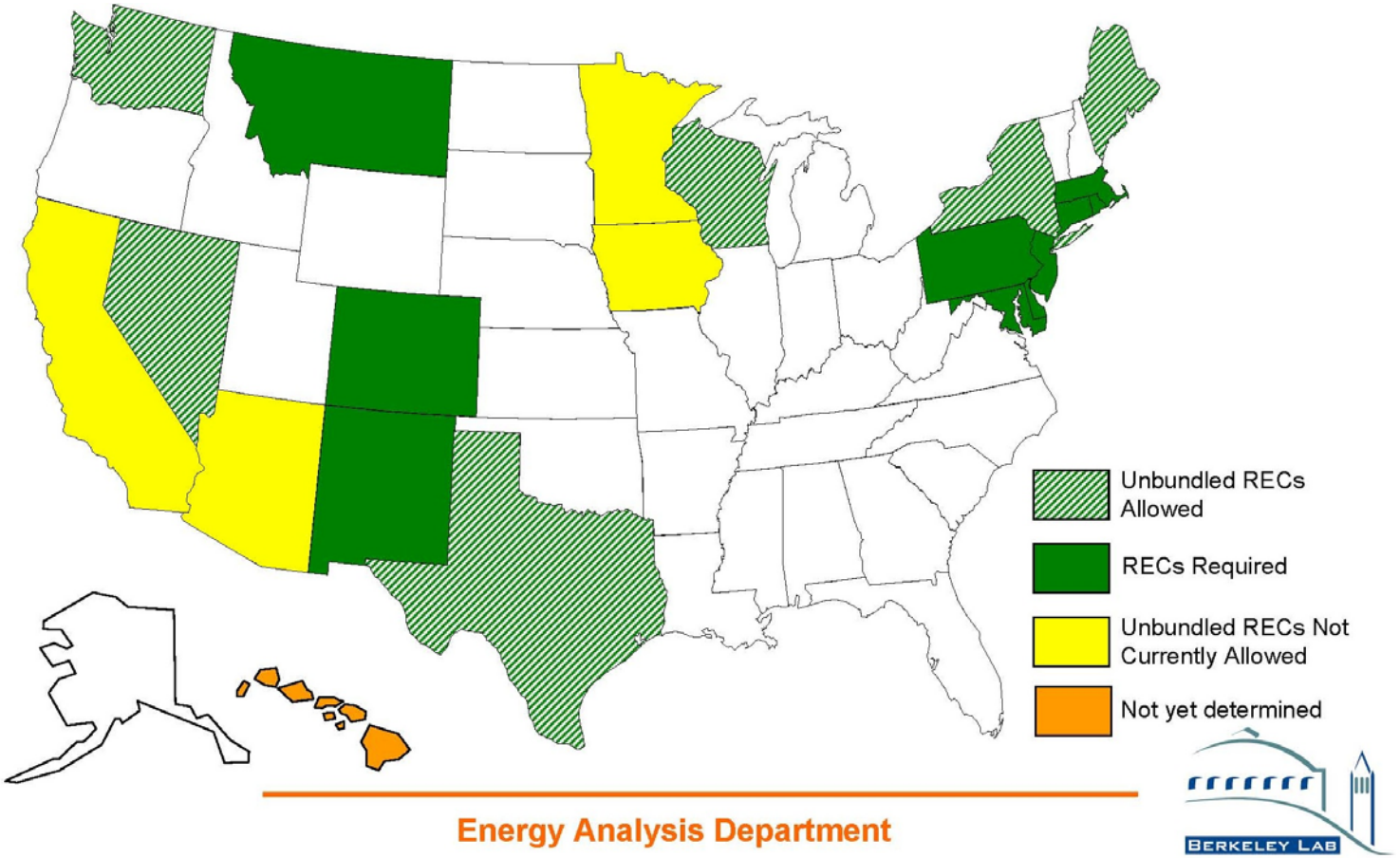
Increase AZ REST goals for renewables

- Demand for RE currently outstripping REST goal
- Relatively higher RPS standards in neighbouring states (AZ: 15 % in 2025)
  - NV: 25% in 2025
  - NM: 20% in 2020
  - CA: 33% in 2020
- Will show long-term state-level support for the renewable energy industry

Allow Tradable RECs

- Position Arizona as a net exporter of renewable energy
- Create financial incentive to generate more renewable energy than currently mandated under the REST
- Increased deployment of renewables → increased job growth in the RE sector

States Utilizing Unbundled RECs

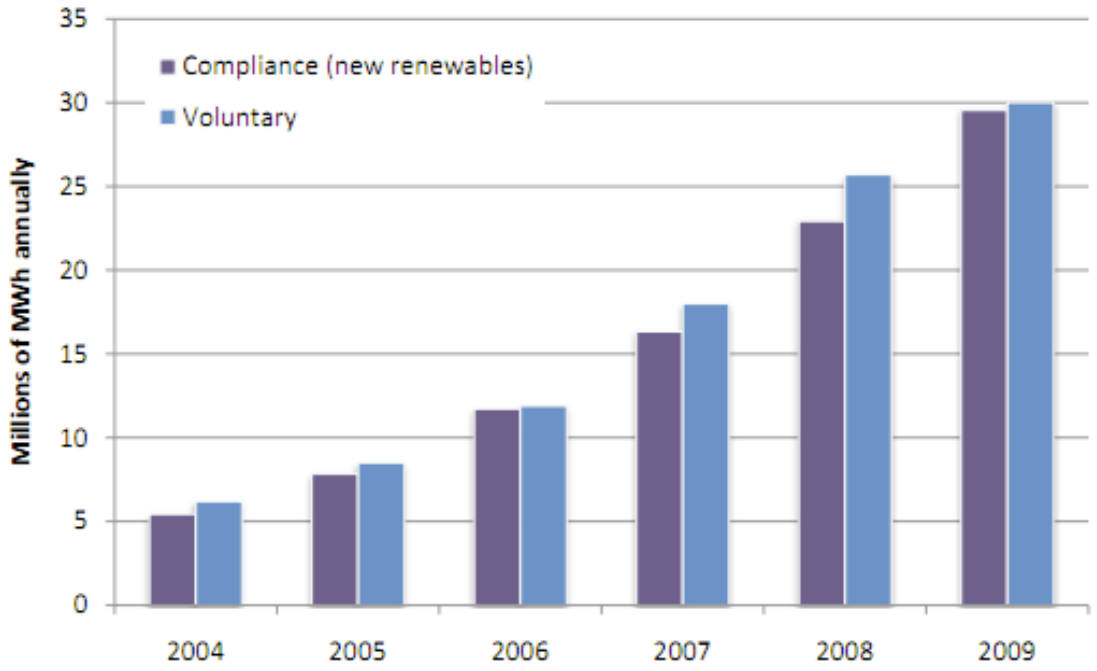


Source: Lawrence Berkeley National Laboratory – April 2007

Benefits of Hybrid REC Model

- Exporting RECs helps foster creation of regional REC market
- RE producers can receive substantial revenue by exporting RECs
  - Additional revenue → increased deployment of renewables

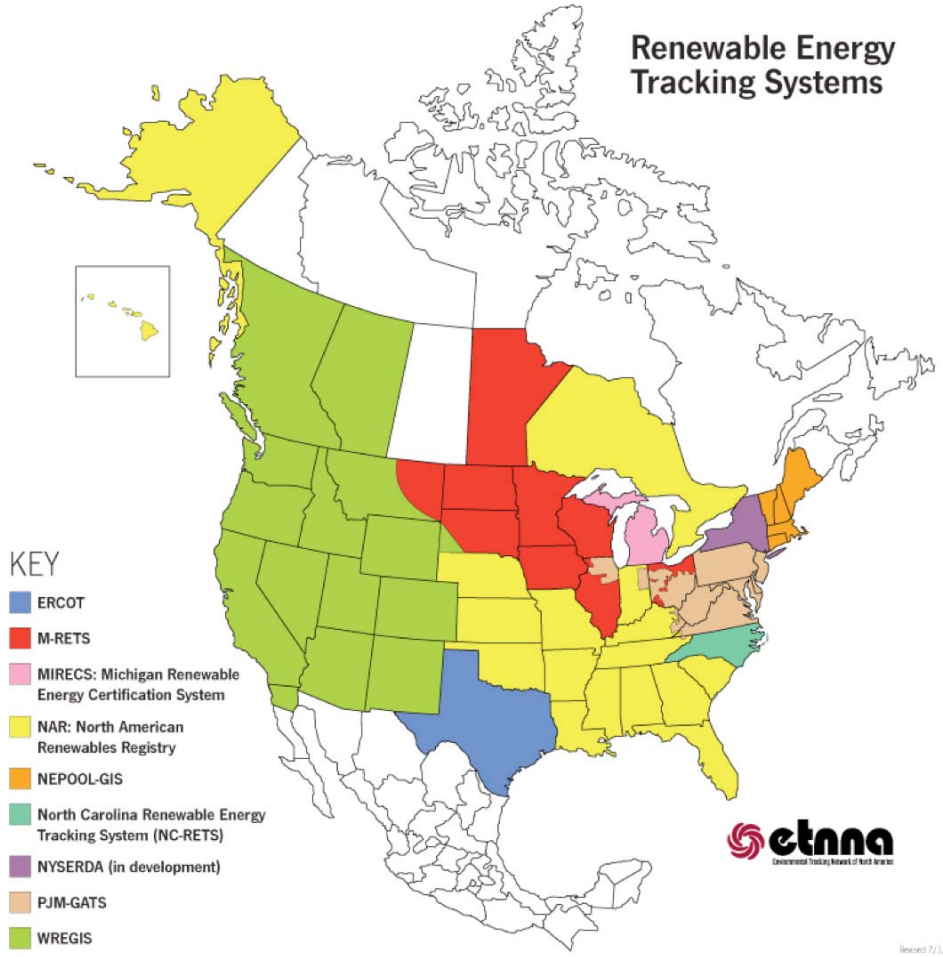
Leverage Power of Voluntary Market



Source: NREL

WREGIS Online Tracking System

- Western Renewable Energy Generation Information System (WREGIS)
- Ensures there is no double counting of unbundled RECs
- Facilitates a more liquid regional RE market
  - E.g., Arizona-based renewable companies may sell into California market



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Alternative Compliance Payment

- Industry needs certainty
- Adequate penalties for non-compliance sends strong positive signal to the market

Conclusion

- Policy recommendations represent significant steps Arizona can take to further the goals of **enhancing economic growth, energy security, and air quality.**

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